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BARKBEETLE LOSS IN PARKER MT. BURN.

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BARKBEETLE LOSS IN PARKER MT. BURN.

In the following brief report is described a forest fire which occurred in southern Oregon in 1924 and the insect conditions which developed on the burned area subsequent to the fire.

The report is intended merely as an office memorandum to preserve the data secured in the study and to make it readily available for reference.

The survey of the burned area was made in July 1925. It was conducted as previous surveys of other areas have been. The technique employed in the study of fire damage and insect conditions on the burned area was identical the methods used in studying the Mistletoe Burn in 1918. The data secured and presented herewith are, in every way, comparable to those of this burn.

LIMITATIONS OF THE STUDY.

Due to the large size of the burned area and the fact that a limited amount of time could be devoted to the study the survey of conditions on the ground was necessarily limited to a very small portion of the burn. However as conditions on the burned area as a whole are very similiar it is believed that the data secured on the portion surveyed are applicable to the entire burn. The results of the study which are presented in this report deal only with the area actually surveyed although it is typical of the whole.

The fire covered an area of about 15,000 acres. The burned area is a narrow rectangle about 3 miles wide and 8 miles long. A strip two chains wide and 55 chains long was surveyed in the north extremity of the burned area. The area surveyed amounted to 11 acres. Every pine tree above 8 inches D.B.H. was examined and a record made of it on which was recorded the fire damage and insect damage, if any. The death of all trees which had died subsequent to the fire was definitely ascertained. Although the fire caused considerbale damage to small stock (up to 8 inches dismeter) no record was made of this loss as the insects involved in this study do not breed in material of this size sufficiemtly to cause appreciable damage. The fir and all species other than pine were also thrown out of consideration because of the same reason.

Other limitations of the study are that the insect conditions on the area previous to the fire were not known. Due to the limited amount of time that could be devoted to the study it was not possible to make a survey of conditions in the forest bordering the burned area. Therefore the insect conditions in these stands are not known.

Because of these limitations the study revealed only such

conditions that actually developed on the burned area subsequent to the fire. The principal value derived from the study lies in the acquisition of additional knowledge on: 1. The degree of fire damage to merchantible pine caused by a ground fire of moderate intensity; 2. The response of barkbeetles to conditions set up on the burned area; 3. The degree of attractiveness of fire injured trees to these insects; and 4. The relative selection exhibited by the beetles for trees which had received varying degees of fire damage or injury.

THE FIRE.

This fire occurred in July 1924 during a long dry period. It started on the south slope of Parker Mountain and spread eastward and westward from this point. The main direction of progress was northward. During a period of 10 days the fire covered an area 3 miles wide and 8 miles long, or about 15,000 acres of mixed pine an fir timber. It was finally stopped at the Ashland-Klamath Falls Highway. The burned area is located in Townships 39, 40, and 41 S, Ranges 4 and 5 East.

The character of the fire was of the surface type and in no place did it reach the proportions of a crown fire. The brush areas and thickets of small stock were wiped out in places where the fire was most intense.

THE BURNED AREA.

The burned over area presents an elongated rectangle of rather flat topography with south and west exposures. The range in elevations is from 3,500 to 4,500 feet. The timber type is mixed stand of yellow pine, sugar pine, white fir, Douglas fir, and a very small percentage of incense cedar. The relative percentages of the pines and firs is shown in fig. 2, Plate I. Sugar pine composed 40% of the volume of the stand; yellow pine 30% and the firs 30%. A comparison of the pines shows that yellow pine represents 48% of the number of trees in the stand and sugar pine 52%. - Fig. 1; Plate I.

DIRECT FIRE DAMAGE.

The trees on the burned area were classified into 5 groups, representing varying degrees of fire injury. This classification is as follows:

Class I - Trees which entirely escaped fire injury.
Class II - Trees which were scorched on the lower trunks only.
Class III - Trees which had the lower trunks and the lower foliage scorched.
Class IV - Trees heavily fire scorched. Lower limbs and practically all the foliage had been burned off. (recovery of these trees from the fire damage is doubtful though possible).
Class V - Trees which had been killed outright by the fire.

The fire damage to the mature pine trees is graphically shown by figs. 3 and 4; Plate I. Fig. 3 shows the classification of fire injury in yellow pine - 25 trees (32%) escaped fire injury. 7 trees (9%) were lightly scorched. 14 trees (18%) received medium fire injury. 23 trees (30%) were badly fire injurgd while 10 trees (14%) were killed by the fire. The highest relative number of trees on the burned area fell into Classes I and IV, the first uninjured and the last severely fire damaged.

Fig. 4 shows the relative fire injury in sugar pine - 32 trees (37%) escaped fire injury; 13 trees (15%) were slightly scorched; 17 trees (20%) suffered medium fire injury; 20 trees (23%) were severely damaged and; 4 trees (5%) were fire killed. In this species Classes I and IV again predominate.

The number of pine trees and their volume falling into these 5 classes are shown in Tables I, II, III, IV, and V.

INSECT ATTACKS ON BURNED AREA.

The principal insects of primary importance found attacking the pines on the burned area were Dendroctonus brevicomis and Dendroctonus monticolae. The former attacked yellow pine only; the latter attacked both yellow pine and sugar pine though the attacks of this beetle in the yellow pine were always associated with Dendroctonus brevicomis. Because the fire occurred during the midsummer period both species of these barkbeetles were flying and attacking. The conditions on the burned area attractive to these beetles were undoubtedly more pronounced at this time than would have prevailed if the fire had occurred later in the season. These conditions probably account in a large measure for the relatively high percentage of attacks in fire weakened trees.

The number of yellow pine trees in each class of fire injury attacked by D. brevicomis is given in Table VI. The relative percentage of attacks in all classes is given in Table VII and graphically shown by the pie graph in Plate II.

In Table VI is given the number of sugar pine trees in each class attacked by D. monticolae. The relative percentage of these attacks appears in Table VIII and is presented graphically by the chart in Plate III.

The graph in Plate IV shows the percentage of yellow pine trees in each class which were attacked by D. brevicomis and the percentage in each class which escaped attack. The graph in Plate V shows the same statistics for the sugar pine which were attacked by D. monticolae.

Table X is a compilation in summarized form of all the preceding data.

The number and percentage of both yellow pine and sugar pine

trees on the burned area which were killed by the fire, attacked by beetles, or survived both fire and beetles is shown in the graph in Plate VI. This graph shows that of the total yellow pine trees on the burned area - 10 trees (12%) were killed outright by the fire; 21 trees (27%) were attacked and killed by Dendroctonus brevicomis, and 46 trees (61%) survived.

Of the total sugar pine trees - 4 trees (5%) were killed by the fire; 13 trees (15%) were attacked and killed by Dendroctonus monticolae and 69 trees (80%) survived.

The total infestation on the burned area which sprang up following the emergence of the broods developed from the attacks made in 1924 was not ascertained. However, up to July 1925, very few new attacks had occurred.

April 16, 1926.

SUMMARY OF DATA.

A forest fire known as the Parker Mountain Burn occurred in a virgin forest in southern Oregon in July 1924.

The occurrence of this fire offered an opportunity of securing additional data on the interrelation of fires and insects.

A portion of the burned area was surveyed and studied in July 1925, one year after the fire occurred.

The fire covered an area of 15,000 acres forested with a mixed stand of pines and firs. The relative percentage by volume of the species composing the stand was 40% sugar pine, 30% yellow pine, and 30% fir. In number of merchantable trees of the pine stand 48% were yellow pine and 52% sugar pine.

The fire occurred during a period of maximum barkbeetle flight and attack offering prime conditions attractive to these beetles.

The data secured were limited to the degree of fire injury to the merchantable pine (above 8" DBH); the relative abundance of barkbeetle attacks in both species of pine on the burned area; and the relative occurrence of attacks by these beetles in classes of trees exhibiting varying degrees of fire injury.

The direct fire loss was relatively heavy. 12% of the total yellow pine trees and 5% of the total sugar pine trees on the area examined were killed outright by the fire. 30% of the yellow pine and 23% of the sugar pine trees were fire injured to the point where their recovery though possible was doubtful. 17% of the yellow pine and 20% of the sugar pine received medium fire injury resulting in scorched trunks and the loss of the foliage up to the middle crown. These trees though weakened had a good chance to recover. 9% of the yellow pine and 15% of the sugar pine received light fire injury consisting of scorched lower trunks which apparently did not injure them. 32% of the yellow pine and 37% of the sugar pine trees escaped all fire injury. The highest percentage of both species of pines on the burned area either escaped all fire injury or were fire damaged severely. The intermediate classes each represented a relatively low percentage.

The insect loss following the fire was far greater than the direct fire loss. Dendroctonus brevicomis attacked the yellow pine. Dendroctonus monticolae attacked the sugar pine. 27% of the total yellow pine trees and 15% of the total sugar pine trees were attacked. The loss from both fire and insects amounted to 39% of the total yellow pine trees and 18% of the total sugar pine trees.

The pine trees on the burned area were classified in 5 classes representing varying degrees of fire injury. Class 1. Trees which escaped all fire injury; 2, those lightly scorched; 3, those receiving medium fire injury; 4, trees severely burned but with a chance of recovery; and 5, trees killed by the fire. The attacks of beetles in both pines occurred in all these 5 classes. Of the total yellow pine trees attacked 13% fell in class 1, 17% in class 2, 8% in class 3, 50% in class 4, and 12% in class 5. Of the total sugar pine trees attacked 30% occurred in trees in class 1, 7% in class 2, 21% in class 3, 35% in class 4, and 7% in class 5. The relatively high percentage of trees of both species attacked in class 4 indicates that both species of beetles preferred trees which had received severe fire injury though not killed outright by the fire.

The insect loss on the burned area as well as in the surrounding stands previous to the fire was not ascertained.

The insect loss on these areas subsequent to the emergence of the broods in the fire injured trees is not known.

The statistical results of the study may be summarized thusly:

Yellow pine attacked by Dendroctonus brevicomis.

1 - 12% killed by fire.
2 - 27% attacked by beetles.
3 - 61% survived.
4 - Fire injury:
    Class I - Not injured, 32%
    Class II - Lightly scorched, 9%
    Class III - Medium fire scorched, 17%
    Class IV - Severe fire injury, 30%
    Class V - Killed by fire, 12%

5 - Classes attacked by beetles:
    Class I - 13%
    Class II - 17%
    Class III - 8%
    Class IV - 50%
    Class V - 12%

6 - Relative abundance of attacks in each class:
    Class I - 12% attacked
    Class II - 57% "
    Class III - 14% "
    Class IV - 52% "
    Class V - 30% "

Sugar pine attacked by Dendroctonus monticolae.

1 - 5% killed by fire.
2 - 15% attacked by beetles.
3 - 80% survived.
4 - Fire injury:
    Class I - Not injured, 37%
    Class II - Lightly fire scorched, 15%
    Class III - Medium fire scorched, 20%
    Class IV - Severe fire injury, 23%
    Class V - Killed by fire, 5%

5 - Classes attacked by beetles:
    Class I - 30%
    Class II - 7%
    Class III - 21%
    Class IV - 35%
    Class V - 7%

6 - Relative abundance of attacks in each class:
    Class I - 12% attacked
    Class II - 8% "
    Class III - 17% "
    Class IV - 25% "
    Class V - 25% "

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Respectfully submitted,

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